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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,513	12/03/2003	Farsheed Mahmoudi	15624-US	3777
23553	7590	04/06/2006	EXAMINER	
MARKS & CLERK			CHAN, RICHARD	
P.O. BOX 957			ART UNIT	
STATION B			PAPER NUMBER	
OTTAWA, ON K1P 5S7			2618	
CANADA				

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/725,513	MAHMOUDI ET AL.	
	Examiner	Art Unit	
	Richard Chan	2618	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-15 is/are allowed.
- 6) ☒ Claim(s) 1,2,9-11 and 16 is/are rejected.
- 7) ☒ Claim(s) 3-7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/18/2004</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Manku (US 6,232,848).

With respect to claim 1, Manku discloses the high linearity, low power, low voltage active mixer for RF applications, comprising: an RF transconductance amplifier connected to the input of RF+ and RF- Fig.6, and to transform the input voltage  $V_{in}$  to current, the transconductance amplifier having a constant transconductance over a wide range of input differential voltages; a mixing stage 12 to down-convert the RF current to the desired IF; an ac-coupling stage between the RF transconductance amplifier and the mixing stage Fig.6 capacitors connected between amplifier and mixing stages; and an IF stage that converts an information bearing signal back to voltage IF+ and IF-.

With respect to claim 9, Manku discloses the high linearity, low power, low voltage active mixer as in claim 1, Manku continues to disclose wherein the mixing

stage is connected to ground through a tuned load, that allows for the low voltage operation of a local oscillator stage. Fig.6 ZL

With respect to claim 10, Manku discloses the high linearity, low power, low voltage active mixer as in claim 9, Manku continues to disclose wherein filtering of the incoming RF signal and the accompanied noise due to the presence of the tuned load in the mixing stage. Paragraph [017]

With respect to claim 16, Manku discloses the method of improving the linearity of a current commutating active mixer comprising: transforming the input voltage V+ and V- to current with a transconductance amplifier, the transconductance amplifier having transconductors with constant transconductance over a wide range of differential input voltages; down-converting the RF current to the desired IF with a mixing stage; ac-coupling the RF transconductance amplifier and the mixing stage; and converting an information bearing signal back to voltage using an IF stage. Fig.6

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manku (US 6,232,848) in view of Sorrels (US 6,813,485).

With respect to claim 2 and 11, Manku discloses the high linearity, low power, low voltage active mixer as in claim 1, however does not specifically disclose wherein the transconductors with constant transconductance result in high linearity in terms of both IIP2 and IIP3.

The Sorrels reference however discloses complimentary FET switch implementations of the invention (lower  $R_{ds,sub.on}$  -increased conversion efficiency, higher IIP2, IIP3, minimal current increase (+CMOS inverter), and lower re-radiation (charge cancellation) FIGS. 112 and 113. See 6.7.4 Paragraph [771]

It would have been obvious to one of ordinary skill in the art to implement the active mixer as disclosed by Manku with technique of achieving high linearity terms of the Intermodulation Interception points.

#### ***Allowable Subject Matter***

Claim 3-7 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claim 3, Manku and Sorrels combined continues to disclose the high linearity, low power, low voltage active mixer as in claim 2, with a capacitive feed-forward path; however the prior does not disclose wherein the RF transconductance amplifier consists of: a p-channel and an n-channel single transistor transconductors and floating voltage source.

Claims 4-7 claim dependency on claim 3.

With respect to claim 8, Manku discloses the high linearity, low power, low voltage active mixer as in claim 1, however the prior art does not disclose wherein the ac-coupling between the RF transconductor and the mixing stage blocks the flicker noise associated with the RF transconductor, and hence reduces the total flicker noise at the output, which favors the design for direct conversion applications.

With respect to claim 12, the prior art does not disclose an RF transconductance amplifier for use in a high linearity, low power, low voltage active mixer, the RF transconductance amplifier comprising; a floating voltage source; a capacitive feed-forward path; and a p-channel and an n-channel single transistor transconductors.

Claim 13-15 are dependent on allowable claim 12.

The following is an examiner's statement of reasons for allowance: The Prior art discloses the high linearity, low power, low voltage active mixer and amplifier, however does not discloses wherein a capacitive feed-forward path is implemented within the amplifier.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Granville reference (US 6,831,507) discloses Transconductive amplifiers.

The Mckinney reference (US 5,621,362) discloses a cascade oscillator having optimum phase noise and bandwidth performance.

The Shah reference (US 2003/0148748) discloses a distortion reduction in a wireless communication device.

The Abou-Allam reference discloses a narrowband LC folded cascade structure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Chan whose telephone number is (571) 272-0570. The examiner can normally be reached on Mon - Fri (9AM - 5PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571)272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard Chan  
Examiner  
2618  
3/30/06

  
NAY MAUNG  
SUPERVISORY PATENT EXAMINER